



ACR ELECTRONICS, INC.

Material Safety Data Sheet

MSDS 54

Revision J

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SECTION 1: Product and Company Identification

ACR Electronics, Inc., 5757 Ravenswood Rd., Ft. Lauderdale, FL. 33312 USA

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Hours of Operation: 9am to 5pm Mon. through Fri.

EMERGENCY 24-HOUR TELEPHONE NUMBERS: CHEM-TEL, INC, Inside U.S. (800) 255-3924, Outside U.S. (813) 248-0585 and FAX (813) 248-0582 see www.chemtelinc.com for more information about Chem-Tel, Inc.

Primary Batteries SHIPPING NAME LITHIUM METAL BATTERIES

1099.1 Battery (LiMnO₂) AquaFix™ PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

1099.2 Battery (LiMnO₂) TerraFix™ PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

1099.3 Battery (LiMnO₂) AeroFix™ PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

Batteries Contained in Equipment SHIPPING NAME LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT

2797.2 / 2797.4 AquaFix™ 406 PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

2798.2 / 2798.4 TerraFix™ 406 PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

2799.2 / 2799.4 AeroFix™ 406 PLB-200/201 (Two battery packs. Each Pack contains four 2/3A cells)

SECTION 2: HAZARDS IDENTIFICATION

Physical Appearance: Small cylindrical batteries

EMERGENCY OVERVIEW

CAUTION: Battery can explode or leak if heated, disassembled, shorted, recharged, exposed to fire or high temperature or inserted incorrectly. Keep in original package until ready to use. Do not carry batteries loose in your pocket or purse. Keep batteries away from children. If swallowed, consult a physician at once. For information on treatment, call the NATIONAL BUTTON BATTERY INGESTION HOTLINE, collect day or night, at (202) 625-3333. Under certain misuse conditions and by abusively opening the battery, exposed lithium can react with water or moisture in the air causing potential thermal burns or fire.

Potential Health Effects:

The chemicals and metals in this product are contained in a sealed can. Exposure to the contents will not occur unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.

Eye Contact: Contact with battery contents may cause irritation.

Skin Contact: Contact with battery contents may cause irritation.

Inhalation: Inhalation of vapors or fumes released due to heat or a large number of leaking batteries may cause respiratory and eye irritation.

Ingestion: Swallowing is not anticipated for larger batteries due to battery size. Smaller batteries may be swallowed. If battery is swallowed, seek immediate medical advice. Batteries lodged in the esophagus should be removed immediately since leakage, caustic burns and perforation can occur as soon as two hours after ingestion. Irritation to the internal/external mouth areas may occur following exposure to a leaking battery. Do not give ipecac.



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SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredient | CAS Number | Concentration/ Concentration Range | Classification and Hazard labeling |
|--|------------|--|---------------------------------------|
| Manganese Dioxide | 1313-13-9 | 30 – 40% | Specific hazards |
| Lithium Metal | 7439-93-2 | 3.4%* | Water forbiddance |
| Mixture solvent of carbonate and ether | – | 10 – 20% | Inflammability |
| Lithium trifluoro methane sulphonate (LiCF_3SO_3) | 33454-82-9 | | – |

*Weight of Lithium per cell: 0.57g

SECTION 4: FIRST AID MEASURES

Eye Contact: If battery is leaking and material contacts the eye, flush thoroughly with copious amounts of running water for 30 minutes. Seek immediate medical attention.

Skin Contact: If battery is leaking and material contacts the skin, remove any contaminated clothing and flush exposed skin with copious amounts of running water for at least 15 minutes. If irritation, injury or pain persists, seek medical attention.

Inhaled: If battery is leaking, contents may be irritating to respiratory passages. Move to fresh air. If irritation persists, seek medical attention.

Swallowed: If battery is swallowed seek immediate medical advice. Batteries lodged in the esophagus should be removed immediately since leakage, caustic burns and perforation can occur as soon as two hours after ingestion. If mouth area irritation or burning has occurred, rinse the mouth and surrounding area with tepid water for at least 15 minutes. Do not give ipecac.

Note to Physician: Published reports recommend removal from the esophagus is done endoscopically (under direct visualization). Batteries beyond the esophagus need not be retrieved unless there are signs of injury to the GI tract or a large diameter battery fails to pass the pylorus. If asymptomatic, follow-up x-rays are necessary only to confirm the passage of larger batteries. Confirmation by stool inspection is preferable under most circumstances. For information on treatment, telephone (202) 625-3333 collect, day or night. Potential leakage of dimethoxyethane, propylene carbonate and lithium perchlorate. Dimethoxyethane rapidly evaporates. Do not give ipecac.

SECTION 5: FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Batteries may burst and release hazardous decomposition products when exposed to a fire situation.

Extinguishing Media: Use dry chemical, alcohol foam, water or carbon dioxide as appropriate for the surrounding fire. For incipient fires, carbon dioxide extinguishers are more effective than water.

Special Fire Fighting Procedures: Firefighters should wear positive pressure self-contained breathing apparatus and full protective clothing. Fight fire from a distance or protected area. Cool fire exposed batteries to prevent rupture. Use caution when handling fire-exposed containers (batteries may explode in heat of fire).



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Hazardous Combustion Products: Thermal degradation may produce hazardous fumes of lithium and manganese; hydrofluoric acid, oxides of carbon and sulfur and other toxic by-products.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Notify safety personnel of large spills. Irritating vapors and flammable may be released from leaking or ruptured batteries. Eliminate all ignition sources. Evacuate the area and allow the vapors to dissipate. Clean-up personnel should wear appropriate protective clothing to avoid eye and skin contact and inhalation of vapors or fumes. Increase ventilation. Carefully collect batteries and place in an appropriate container for disposal. Remove spilled liquid with absorbent and contain for disposal.

SECTION 7: HANDLING AND STORAGE

Avoid mechanical or electrical abuse. DO NOT short circuit or install incorrectly. Batteries may explode pyrolyze or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions. Replace all batteries in equipment at the same time. Do not carry batteries loose in a pocket or bag.

Storage: Store batteries in a dry place at normal room temperature.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

The following occupational exposure limits are provided for informational purposes. No exposure to the battery components should occur during normal consumer use.

Ventilation: No special ventilation is needed for normal use. **Respiratory Protection:** None required for normal use.

Skin Protection: None required for normal use. Use butyl rubber gloves when handling

| Chemical Name | Exposure Limits ACGIH | |
|--|--------------------------|------------------|
| | TLV-TWA | BEI |
| Manganese Dioxide | Mn 0.2 mg/m ³ | None Established |
| Lithium Metal | None Established | None Established |
| Mixture solvent of carbonate and ether | None Established | None Established |
| Lithium trifluoro methane sulphonate (LiCF ₃ SO ₃) | None Established | None Established |

leaking batteries.

Eye Protection: None required for normal use. Wear safety goggles when handling leaking batteries.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Water Solubility: DME-Complete, PC-Moderate

Boiling Point: (°C): DME-85, PC-242

Vapor Pressure: (mmHg): DME-61, PC-0.03

Vapor Density: (Air=1): DME-3.1

Flash Point: 29°F DME:-1

Evaporation Rate: (Butyl Acet.=1):DME:4.99

Melting Point: (°C): Li-179, MnO₂-decomposes at 535, LiCl₄-236

Specific Gravity: (H₂O=1): MnO₂-5.03, PC-1.20, DME-0.87, Li-0.54,LiClO₄-2.43

Appearance and Odor: Lithium is a soft, silvery metal. MnO₂ is a black powder. PC is a colorless, odorless liquid. DME is a colorless liquid with a sweet odor.



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SECTION 10: STABILITY AND REACTIVITY

Stability: This product is stable.

Incompatibility/Conditions to Avoid: Contents are incompatible with strong oxidizing agents. Do not heat, crush, disassemble, short circuit or recharge.

Hazardous Decomposition Products: Thermal decomposition may produce hazardous fumes of lithium and manganese; hydrofluoric acid, oxides of carbon and sulfur and other toxic by-products.

Hazardous Polymerization: Will not occur

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Toxicity Data:

Manganese Dioxide: Acute toxicity: rabbit^{*1}: LD₅₀(blue pipe)=45mg/kg, Mouse^{*2}: LD₅₀(subcutaneous)= 422mg/kg Local effect: Irritation to eye, nose, throat and skin

Lithium Metal: Acute toxicity: No information in a metal state: Local effect: contact with skin or eye causes thermal burn and alkaline's chemical burn

Carbonate: Acute toxicity: No information at present: Local effect: No information at present

Ether: Acute toxicity: Rat^{*4} oral LD₅₀=7000mg/kg: Local effect Light irritation to skin

Lithium Trifluoro methane Sulfonate(LiCF₃SO₃): Acute toxicity: No information at present: Local effect: Slight irritation to mucous membranes

Chronic Effects: The chemicals in this product are contained in a sealed can and exposure does not occur during normal handling and use. No chronic effects would be expected from handling a leaking battery.

Target Organs: Skin, eyes and respiratory system.

SECTION 12: ECOLOGICAL INFORMATION

No ecotoxicity data is available. This product is not expected to present an environmental hazard.

SECTION 13: DISPOSAL INFORMATION

Lithium batteries are best disposed of as a non-hazardous waste when fully or mostly discharged. The Federal Environmental Protection Agency (EPA) (governed by the Resource Conservation and Recovery Act (RCRA)) do not list or exempt Lithium as a hazardous waste. However, if waste lithium batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amounts of unreacted lithium in the battery. The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste (as required by the U.S. Land Ban Restrictions for the hazardous and Solid Waste Amendments of 1984.) Secondary treatment centers receive these batteries as manifested hazardous waste under code "D003 - reactive." Use a professional disposal firm for disposal of mass quantities of undischarged lithium batteries.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212°F. Such treatment can cause cell rupture.

Contact your local government for disposal practices in your area.



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SECTION 14: TRANSPORT INFORMATION

The transportation of lithium metal batteries and lithium metal batteries contained in equipment is regulated as UN3090 and UN3091 by ICAO, IATA, IMO and US DOT. The listed lithium metal batteries cells and batteries are subject to the provisions of the regulations as long as they are packaged and marked in accordance with the regulations.

(The lithium content of cells contained in this document is less than 1 gram. The lithium content of batteries contained in this document is more than 2 grams)

The listed lithium metal batteries meet the requirements of the UN Manual of Tests and Criteria, Part III subsection 38.3. In addition, each shipment must be accompanied by appropriate documentation and the package must be capable of withstanding the drop test requirements.

Transportation in the United States (Reference 49 CFR parts 171, 172, 173 and 175) **Passenger Aircraft Ban for shipments (Lithium Batteries only)**

All primary lithium metal batteries are banned as cargo on passenger aircraft. The outside of each package must be labeled with the following statement: "**PRIMARY LITHIUM BATTERIES-**

FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT". The labeling requirement covers shipments via highway, rail, vessel or aircraft and covers all shipments inside the US.

Shipping name: Lithium Metal Batteries UN Number 3090 Class 9 Packing Group II

Shipping name: Lithium Metal Batteries Contained In Equipment UN Number 3091 Class 9
Packing Group II

The listed batteries and battery packs were tested and meets requirements for shipping per The UN Manual of Tests and Criteria, Part III, Subsection 38.3, UN T1-T8 Tests ST/SG/AC.10/11.

Except for personal use, the shipment of lithium metal batteries aboard passenger aircraft is no longer allowed. Airline passengers may continue to have non-rechargeable lithium batteries for their equipment and a reasonable amount of spare non-rechargeable lithium batteries for their equipment in their carry-on luggage – not in their checked baggage. For more information, air travelers should consult the US Department of Transportation (DOT) Safety Travel web site at <http://safetravel.dot.gov>

Transportation Internationally **(Reference IATA Dangerous Goods Regulations 50th edition)**

Lithium Metal Batteries: Effective January 1, 2009, new ICAO regulations (Packing Instruction 968, Part 2) for air cargo shipments require a reduced package size quantity and the use of a Cargo Aircraft Only label. The maximum quantity per package must not exceed 2.5 Kg G.

Shipping name: Lithium Metal Batteries UN Number 3090 Class 9 Packing Group II

Lithium Metal Batteries Contained in Equipment: Effective January 1, 2009, new ICAO regulations (Packing Instruction 970, Part 2) for passenger air shipments require a reduced package size quantity. The maximum quantity per package must not exceed 5 Kg.

Shipping name: Lithium Metal Batteries Contained In Equipment UN Number 3091 Class 9
Requires Strong Outer Packaging

At this time, IMO and ADR continue to follow Special Provision 188 from the UN Model Regulations.



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SECTION 15: REGULATORY INFORMATION

United States

OSHA Status: While the finished product(s) is considered an article and not covered by the OSHA Hazard Communication Standard, 29 CFR 1910.1200, this MSDS contains valuable information critical to the safe handling and proper use of the product".

EPA TSCA Status: All intentionally-added components of this product are listed on the US TSCA Inventory.

SARA 313/302/304/311/312 chemicals: Manganese compounds 15-45%

California: This product has been evaluated and does not require warning labeling under California Proposition 65.

Canada All intentionally-added components of this product are listed on the Canadian DSL. This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and this MSDS contains all information required by the Controlled Products Regulations.

SECTION 16: OTHER INFORMATION

P&G Hazard Rating: Health: 0 Fire: 0 Reactivity: 0

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Data supplied is for use only in connection with occupational safety and health.

DISCLAIMER: This MSDS is intended to provide a brief summary of our knowledge and guidance regarding the use of this material. The information contained here has been compiled from sources considered by the Cobham Life Support, ACR Products and its affiliates to be dependable and is accurate to the best of the Company's knowledge. It is not meant to be an all-inclusive document on worldwide hazard communication regulations.